

Eric W. Fowler, Ph.D.

[Google Scholar Profile:](#)

314A Hoyt Laboratory, Department of Chemical & Biological Engineering, Princeton University, Princeton, NJ, 08544

Email: FowlerE@princeton.edu

Education

2013-2021 **Doctor of Philosophy (Ph.D.), Materials Science and Engineering**

University of Delaware, Newark, DE

Dissertation Advisor: Dr. Xinqiao Jia, Ph.D.

2008-2011 **Bachelor of Science (B.S.), Polymer Science**

University of Southern Mississippi, Hattiesburg, MS

Research and Professional Experience

2022-Present **Postdoctoral Research Associate**

Dr. Celeste Nelson, Ph.D.

Department of Chemical & Biological Engineering, Princeton University, Princeton, NJ

- Constructed and investigated organoid models of lung development

2021-2022 **Postdoctoral Research Associate**

Dr. Xinqiao Jia, Ph.D.

Department of Materials Science and Engineering, University of Delaware, Newark, DE

- Characterized biocompatibility of hyaluronic acid (HA) based hydrogels in rat salivary glands

2013-2021 **Graduate Research Assistant**

Dr. Xinqiao Jia, Ph.D.

Department of Materials Science and Engineering, University of Delaware, Newark, DE

Dissertation: Fine Tuning Matrix Structure and Bioactivity to Mediate 3D Assembly of Human Salivary Progenitor Cells

Salivary Gland Tissue Engineering:

- Developed HA-based hydrogels that support the 3D assembly of primary human salivary gland stem progenitor cells (hS/PC) and investigated their response to varying modulus, integrin/syndecan adhesion, and proteolytic degradation
- Investigated the role of TFG- β and YAP signaling in the maintenance of hS/PC progenitor identity

Chemical and Materials Characterization:

- Chemical modification of HA with biocompatible functional groups
- Synthesis and characterization of bioactive peptides derived from basement membrane proteins
- Characterization of crosslinking kinetics and hydrogel mechanical properties using oscillatory rheology and high-resolution magic angle spinning NMR

Collaborators: Dr. Kristi L. Kiick, University of Delaware, Dr. Susan L. Thibeault, University of Wisconsin Madison, Dr. Robert Akins, Nemours/Alfred I. duPont Hospital for Children

2010-2013 **Research Technician**
School of Polymers and High Performance Materials
Thames-Rawlins Research Group, University of Southern Mississippi, Hattiesburg, MS

Development and Characterization of Epoxy Resin Thermosets

- Characterization of epoxy-amine reaction kinetics via Mid-IR Spectroscopy, Near-IR Spectroscopy, and Differential Scanning Calorimetry and Dynamic Mechanical Analysis

2008-2010 **Undergraduate Researcher**
School of Polymers and High Performance Materials
Thames-Rawlins Research Group, University of Southern Mississippi, Hattiesburg, MS

Characterization of Epoxy Resin Thermosets

- Formulation of high performance epoxy thermosets and characterization of fracture toughness

Teaching Experience

Fall 2021 – Guest Lecturer “Solid Phase Peptide Synthesis” Department of Materials Science and Engineering, University of Delaware, Newark, DE

- MSEG 832: Principles of Polymerization

Fall 2015 – Graduate Teaching Assistant, Department of Materials Science and Engineering, University of Delaware, Newark, DE

- MSEG 460/660: Biomaterials and Tissue Engineering

Research Mentoring

Undergraduate Students:

- Mark Ho, Chemical Engineering, University of Delaware; Development of experimental design and peptide synthesis
- Alison Jones, Chemical Engineering, University of Delaware; Synthesis of sulfated hyaluronic acid and peptide modifications

Managerial / Leadership

- Laboratory Safety Officer: September 2016-2018
- Instrument caretaker and new user trainer for rheometer, gel permeation chromatograph, high performance liquid chromatograph, and dynamic mechanical analyzer
- Polymeric Materials Science and Engineering (PMSE): University of Delaware, Graduate Student-President 2014-2015
- Materials Research Society (MRS): University of Delaware, Graduate Student -Vice President 2014-2015
- Polymer Science Association, University of Southern Mississippi, Undergraduate -Secretary, 2009-2010, Vice President, 2010-2011

Awards

- Best Poster Awarded at Gordon Research Seminars (GRS) "Multi-Scale Adhesion Mechanics and Signaling" 2018
- The University of Delaware Dissertation Fellowship Award (2019-2020)

Publications

†: co-corresponding author; *: co-first author contribution

14. **Fowler, E. W.**[†], Venrooy, E. V., Witt, R. L. & Jia, X.[†] A TGFβR inhibitor represses keratin-7 expression in 3D cultures of human salivary gland progenitor cells. *Sci Rep* 12, 15008 **2022**. doi: 10.1038/s41598-022-19253-x
13. **Fowler, E. W.**, Ravikrishnan, A., Witt, R. L. & Jia, X. RGDSP-Decorated Hyaluronate Hydrogels Facilitate Rapid 3D Expansion of α-Amylase Expressing Salivary Gland Progenitor Cells, *Acs Biomater Sci Eng*, **2021**. doi: 10.1021/acsbomaterials.1c00745
12. Ravikrishnan, A. *, **Fowler, E. W.** *, Stuffer, A. J. & Jia, X. Hydrogel-Supported, Engineered Model of Vocal Fold Epithelium. *Acs Biomater Sci Eng* 7, 4305-4317 **2021**. doi:10.1021/acsbomaterials.0c01741.
11. Scott, R. A., **Fowler, E. W.**, Jia, X., Kiick, K. L. & Akins, R. E. Regulation of neovasculogenesis in co-cultures of aortic adventitial fibroblasts and microvascular endothelial cells by cell-cell interactions and TGF-β/ALK5 signaling. *Plos One* 15, e0244243 **2020**.
10. Zerdoum, A. B. *, **Fowler, E. W.** *, & Jia, X. Induction of Fibrogenic Phenotype in Human Mesenchymal Stem Cells by Connective Tissue Growth Factor in a Hydrogel Model of Soft Connective Tissue. *Acs Biomater Sci Eng* 5, 4531–4541 **2019**.
9. King, R. E., Lau H. K., Zhang H., Sidhu I., Christensen M. B., **Fowler, E. W.**, Li L, Jia X., Kiick K. L., & Thibeault S. L. Biocompatibility and Viscoelastic Properties of Injectable Resilin-Like Polypeptide and Hyaluronan Hybrid Hydrogels in Rabbit Vocal Folds. *Regen Eng Transl Medicine* 5, 373–386 (**2019**).
8. Hao, Y.; Song, J.; Ravikrishnan, A.; Dicker, K. T.; **Fowler, E. W.**; Zerdoum, A. B., Li, Y., Zhang, H., Rajasekaran, A. K., Fox, J. Jia, X. “Rapid Bioorthogonal Chemistry Enables in Situ Modulation of the Stem Cell Behavior in 3D without External Triggers” *ACS Applied Materials & Interfaces*, **2018**, 10, 26016-26027
7. Hao, Y.; **Fowler, E. W.**; Jia X. “Chemical Synthesis of biomimetic hydrogels for tissue engineering” *Polymer International*, **2017**, 66, 1787-1799
6. Ozdemir, T. *, **Fowler, E. W.** *, Harrington, D. A.; Witt, R. L.; Farach-Carson, M. C.; Pradhan-Bhatt, S.; Jia, X., “Tuning Hydrogel Properties to Promote the Assembly of Salivary Gland Spheroids in 3D”, *ACS Biomater. Science and Engineering*, **2016**, 2, 2217-2230
5. Ozdemir, T.; **Fowler, E. W.**; Hao, Y.; Harrington, D. A.; Witt, R. L.; Farach-Carson, M. C.; Pradhan-Bhatt, S.; Jia, X. “Biomaterials-Based Strategies for Salivary Gland Tissue Regeneration” *Biomaterials Science*, **2016**, 4, 592-604.
4. Pramanik, M.; **Fowler, E. W.**; Rawlins, J. W. “Another Look at Epoxy Thermosets Correlating Structure with Mechanical Properties”, *Polymer Engineering and Science*, **2014**, 54, 1990-2004.
3. Pramanik, M.; **Fowler, Eric W.**; Rawlins, James W. “Cure Kinetics of Several Epoxy–Amine Systems at Ambient and High Temperatures”, *Journal of Coatings Technology and Research*, **2014**, 11, 143–157.
2. Pramanik, M.; **Fowler, Eric W.**; Rawlins, James W. Cure Kinetics of Several Epoxy-Amine Systems at Ambient and High Temperature” 40th Annual International Waterborne, High-Solids, and Powder Coatings Symposium, February 4 - 8, 2013, New Orleans, LA, USA, (paper presentation). Published as proceedings, pp 378-396
1. **Fowler, Eric W.**; Pramanik, M., Rawlins, James W. “Near IR cure kinetics of a dgeba-based epoxy prepolymer with various crosslinkers” Society for the Advancement of Materials and Process and Engineering (SAMPE), October 17-20, 2011, Fort Worth, TX, (paper presentation). Published as proceedings, ISBN 9781934551103

Conference Presentations

- **Fowler E. W.**, Ravikrishnan A., Jia X.; Assembly and Differentiation of Salivary Stem/Progenitor Cells in Bioactive Synthetic Matrices. Poster Presentation. 256th ACS National Meeting & Exposition, Boston, MA, August 19-23, 2018
- **Fowler E. W.**, Jia X.; Multifunctional hyperbranched Polyglycerol as Building Blocks for the Synthesis of Cell Instructive Hydrogels. Poster Presentation. 256th ACS National Meeting & Exposition, Boston, MA, August 19-23, 2018
- Ravikrishnan, A., **Fowler E. W.**; Jia X.; Tuning matrix properties to regulate the phenotype and functions of epithelial cells. Poster Presentation. 256th ACS National Meeting & Exposition, Boston, MA, August 19-23, 2018
- **Fowler E. W.**; Ravikrishnan A., Jia X. “Bioactive Peptides Direct Salivary Gland Stem/Progenitor Cell Fate in a Synthetic Matrix.” Gordon Research Conference (GRC) "Signaling by Adhesion Receptors" Poster Presentation, University of New England, Biddeford, ME June 24-29, 2018
- **Fowler E. W.**; Ravikrishnan A., Jia X. “Bioactive Peptides Direct Salivary Gland Stem/Progenitor Cell Fate in a Synthetic Matrix.” Gordon Research Seminars (GRS) "Multi-Scale Adhesion Mechanics and Signaling" Poster Presentation, University of New England, Biddeford, ME June 18-24, 2018
- Ravikrishnan A.; **Fowler E. W.**; Jia X.; “Engineering Functional Vocal Fold Epithelium Using Hyaluronic Acid-Based Hydrogels” Gordon Research Conference (GRC) "Signaling by Adhesion Receptors" Poster Presentation, University of New England, Biddeford, ME June 24-29, 2018
- Ravikrishnan A.; **Fowler E. W.**; Jia X.; “Engineering Functional Vocal Fold Epithelium Using Hyaluronic Acid-Based Hydrogels” Gordon Research Seminars (GRS) "Multi-Scale Adhesion Mechanics and Signaling" Poster Presentation, University of New England, Biddeford, ME June 18-24, 2018
- Ravikrishnan, A.; **Fowler, E. W.**; Pradhan-Bhatt, S.; Harrington, D. A.; Witt, R. L.; Farach-Carson, M. C.; Jia, X. “Multicellular Assemblies of Salivary Stem/Progenitor Cells in Peptide-Decorated Hyaluronic Acid-Based Hydrogels”, Oral Presentation, Biomedical Engineering Society (BMES) 2017 Annual Meeting, Phoenix, Az, October 11-14, 2017
- **Fowler, E. W.**; Ozdemir, T.; Pradhan-Bhatt, S.; Harrington, D. A.; Witt, R. L.; Farach-Carson, M. C.; Jia, X. “Hyaluronic acid-based permissive and instructive hydrogels for the assembly of salivary gland spheroids” Oral Presentation, 252nd ACS National Meeting & Exposition, Philadelphia, PA, August 21-25, 2016.
- Ozdemir, T.; **Fowler, E. W.**; Hao, Y.; Pradhan-Bhatt, S.; Harrington, D. A.; Witt, R. L.; Farach-Carson, M. C.; Jia, X. “Biomimetic Hydrogels for the Assembly of Salivary Gland Microtissues”, Oral Presentation BMES 2015 Annual Meeting, Tampa, FL, October 7-10, 2015.
- **Fowler, E. W.**; Ozdemir, T.; Pradhan-Bhatt, S.; Harrington, D. A.; Witt, R. L.; Farach-Carson, M. C.; Jia, X. “Hyaluronic Acid-Based Hydrogels with Network-Disruptive Dangling Ligands for the Assembly of Acinar Spheroids”, Oral Presentation, 250th ACS National Meeting & Exposition, Boston, MA, August 16-20, 2015.
- Pramanik, M.; **Fowler, E. W.**; Mendon, S. K.; Rawlins, J. W. “Cure Kinetics of Epoxy Resin via Near IR”, Poster Presentation, Polymer Composite Matrix Science Workshop, New Orleans, LA, February 8-9, 2010.
- Swanson, J. O.; **Fowler, E. W.**; Wand, S. M.; Pramanik, M.; and Rawlins, J. W. "Investigation of Network Development and Properties in Multifunctional Epoxy Resins Using 3,3'-DDS", Excellence in Thermoset Polymer Research Award, Glen Ellyn, IL 2010 (Honorable Mention) Published in meeting proceedings.